SEP 22 1920

June 1920 Entomological Series. Vol. VII, Nos. 1 & 2

Biological & Medical Serials

Memoirs of the Department of Agriculture in India

STORAGE

NO. 1. NEW INDIAN GALL MIDGES (*DIPTERA*)

BY

E. P. FELT

State Entomologist of New York, U.S.A

NO. 2. DESCRIPTION OF A RHINOCYPHINE LARVA FROM SHILLONG

BY

MAJOR F. C. FRASER, I.M.S

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PRINTED AND PUBLISHED FOR

THE IMPERIAL DEPARTMENT OF AGRICULTURE IN INDIA

BY

THACKER, SPINK & CO., CALCUTTA

W. THACKER & CO., 2, CREED LANE, LONDON

Price, Re. 0-12-0 or 1s. 6d.

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NEW INDIAN GALL MIDGES (*DIPTERA*).

BY

E. P. FELT

State Entomologist of New York, U. S. A.

(Received for publication on 31st October, 1919.)

Two small collections of gall midges, Itonididæ, were received under dates of February 27, and March 10, 1919, from Mr. T. Bainbrigge Fletcher, Imperial Entomologist, with a request for identification. We were able to determine all but three of the total of eighteen lots submitted for examination, though there was but one specimen in one of the lots. This speaks well for those who handled the material.

It will be seen by referring to the subsequent matter that two new and extreme types of the Trifili have been brought to light, one *Raodiplosis*, remarkable for the very narrow wings, the proportions approaching those obtaining in *Colpodia*, and the other *Horidiplosis*, noteworthy because of the peculiar palpi. As was to be expected, many of the rearings proved to be undescribed species of well-known genera. An addition to our knowledge of the food habits of *Dyodiplosis andropoginis*, Felt, was secured through the rearing of this species from galls in the shoots of *Andropogon pertusus* collected at Coimbatore.

There must be in India a large number of unknown gall midges awaiting discovery. This is suggested by the fact that in the State of New York practically 600 species belonging to 75 genera have been already recognized and the ground has by no means been thoroughly covered. The richness of the flora and the range in climate in India would indicate a considerably larger fauna. The work already accomplished should be considered as simply an introduction to an almost unexplored field.

The following descriptions represent our conclusions concerning these latest sendings.

Asphondylia lantanae, n. sp.

A series of midges was reared on 30th August, 1917, from galls in the flowers of *Lantana indica* collected by Y. Ramachandra Rao, in the Nilgiris, altitude 5,300 feet. The same species was reared from the flowers of *Lantana camara* at Kallar, Nilgiris, by the same collector.

Male. Length 2·5 mm. Antennæ nearly as long as the body, light brown, 14 segments, the fifth with a length five times its diameter, terminal segment somewhat produced and with a length about six times its diameter. Palpi: first segment short, irregular, the second with a length about three times its diameter, the third nearly twice the length of the second. Mesonotum reddish brown, the submedian lines sparsely haired. Scutellum reddish brown, thickly haired apically. Postscutellum darker. Abdomen sparsely haired, reddish brown. Halteres pale yellowish brown. Coxæ, femora and tibiæ yellowish brown, the tarsi somewhat lighter. Claws long, stout, strongly curved apically, the pulvilli a little shorter than the claws. Genitalia: basal clasp segment short, broad; terminal clasp segment very short, subglobose, the dentations so reduced that the apical chitinized portion appears almost like a heavy ridge; dorsal plate short, divided, the lobes suborbicular; ventral plate short, deeply and roundly emarginate, the lobes short and tapering to a broadly rounded apex.

Female. Length 2·5 mm. Antennæ about three-fourths the length of the body, sparsely haired, yellowish brown, 14 segments, the fifth with a length about five times its diameter, the twelfth segment with a length one-half greater than its diameter, the thirteenth with a length about three-fourths its diameter, and the fourteenth disc-like. Palpi: first segment short, irregular, the second with a length nearly three times its width, the third about one-half longer and more slender than the third. Mesonotum dark shining brown, the submedian lines thickly haired, scutellum and postscutellum yellowish brown. Abdomen rather thickly haired, mostly dark brown. Halteres yellowish basally, somewhat fuscous apically. Coxæ and femora light brown. Tibiæ and tarsi mostly yellowish brown, the distal tarsal segments darker. Claws heavy, strongly curved, the pulvilli shorter than the claws. Ovipositor about as long as the abdomen. Type Cecid. A 2972.

Asphondylia phyllanthi, n. sp.

A series of flies was reared from peculiar, spiny, spherical leaf and shoot galls on *Phyllanthus emblica*, 25th March, 1918. The specimens were collected in Maymyo, Burma, by Y. Ramachandra Rao.

Male. Length 2·75 mm. Antennæ about as long as the body, rather sparsely haired, yellowish brown, 14 segments, the fifth with a length four times its diameter; the terminal segment with a length about six times its diameter. Palpi: first segment short, irregular, the second with a length nearly three times its diameter, the third one-half longer. Mesonotum dark reddish brown, the submedian lines rather thickly clothed with long setæ. Scutellum brownish yellow, rather thickly setose. Postscutellum light brown, abdomen sparsely haired, dark reddish brown. Halteres fuscous yellowish basally, fuscous apically. Coxæ brownish yellow. Femora dark brown apically. Tibiæ and tarsi dark brown, those of the posterior legs yellowish brown, except that the distal tarsal segments are darker. Claws moderately long and heavy, strongly curved, the pulvilli a little longer than the claws. Genitalia: basal clasp segment short, greatly swollen; terminal clasp segment short, with widely divergent teeth; dorsal plate short, divided, the lobes suborbicular.

Female. Length 2·75 mm. Antennæ about three-fourths the length of the body, rather sparsely haired, yellowish brown, 14 segments, the fifth with a length about four times its diameter, the twelfth with a length about twice its diameter, the thirteenth with a length one-half greater than its diameter, and the fourteenth with a length about equal to its diameter. Palpi: first segment short, irregular, the second broad, with a length about two and a half times its width, the third fully one-half longer than the second. Ovipositor when extended with a length about equal to the abdomen. Other characters nearly as in the male. Type Cecid. A 2981.

Schizomyia assamensis, n. sp.

This interesting species was reared in June and July, 1918, by T. Bainbrigge Fletcher from galls on the leaves of *Rubus assamensis*, collected at an altitude of five thousand feet at Shillong, Assam.

Male. Length 1·5 mm. Antennæ about three-fourths the length of the body, sparsely haired, dark brown, 14 segments, the fifth with a stem one-eighth the length of the subcylindric basal enlargement, which latter has a length about four times its diameter and unusually heavy and high circumfila; terminal segment slightly reduced, with a length a little over three times its diameter and tapering from the apical fourth to a subacute apex. Palpi: first segment broadly oval, second irregular, the third one-half longer than the second, more slender, and the fourth about one-half longer than the third, more slender. Mesonotum reddish brown, the submedian lines thickly haired, scutellum fuscous yellowish, postscutellum yellowish

brown. Abdomen rather thickly haired, mostly dark reddish brown. Halteres yellowish basally, fuscous apically. Coxæ fuscous yellowish, the legs a nearly uniform dark brown and unusually slender. Claws long, slender, slightly curved, the pulvilli rudimentary. Genitalia: basal clasp segment rather long, somewhat slender and apically with a roundly triangular, thickly setose terminal lobe; terminal clasp segment short, stout, rather strongly curved, the apex roundly excavated and with somewhat produced obtuse lateral angles; dorsal plate rather long, broad, deeply and triangularly incised, the lobes obtusely triangular and sparsely setose; ventral plate long, deeply and roundly emarginate, the lateral margins irregularly serrate and setose, the lobes rather long and narrow.

Female. Length 1·5 mm. Antennæ as long as the body, sparsely haired, reddish brown, fourteen segments, the fifth with a stem one-fifth the length of the cylindric basal enlargement, which latter has a length about four times its diameter; circumfila unusually heavy and produced at the tips of the segments as irregular loops; twelfth segment with a length about twice its diameter, the thirteenth with a length about equal to its diameter, and the fourteenth a little shorter. Palpi: first segment broadly oval, second a little longer, more slender, the third one-half longer than the second and the fourth one-half longer than the third. Mesonotum dark brown, the submedian lines rather thickly haired. Scutellum fuscous yellowish. Postscutellum yellowish brown. Abdomen thickly haired, dark brown. The slender ovipositor with a length when extended probably exceeding that of the body, the terminal lobes very slender and sparsely setose. Type Cecid. A 2983.

Contarinia caudata, n. sp.

The midges were reared on 11th December, 1916, from ear-heads of *Apluda varia* and *Andropogon schœnanthus*, collected at Coimbatore, South India. The females are noteworthy because of their slender form, long ovipositor and moderately narrow wings.

Male. Length 2 mm. Antennæ probably one-half longer than the body, sparsely haired, light brown, 14 segments, the fifth with stems having a length equal to the diameter and one-half greater than the diameter respectively; basal enlargement subglobose, distal enlargement broadly oval. Palpi: first segment short, irregular, second a little longer, the third with a length nearly three times its diameter, the fourth one-half longer than the third. Mesonotum dark reddish brown, scutellum and postscutellum yellowish brown. Abdomen dark reddish brown. Halteres and legs pale yellowish, claws moderately long, strongly curved apically, the pulvilli as long as the claws. Genitalia: basal

clasp segment moderately long, stout ; terminal clasp segment swollen basally, slender apically, dorsal plate deeply and triangularly emarginate, the lobes somewhat divergent and subacute apically ; ventral plate indistinct in the preparation.

Female. Length 2·5 mm. Antennæ a little shorter than the body, sparsely haired, pale yellowish, 14 segments, the fifth with a stem one-fourth the length of the cylindrical basal enlargement, which latter has a length about three times its diameter ; terminal segment somewhat produced with a length about four times its diameter and apically a short broad knob-like appendage. Palpi : first segment short, irregular, the second with a length three times its width, the third one-fourth longer and more dilated than the second, the fourth a little shorter and more slender than the third. Mesonotum yellowish brown. Scutellum pale yellowish. Postscutellum yellowish brown. Abdomen mostly reddish brown. Halteres and legs pale straw. Ovipositor when extended probably about one-half longer than the insect. The terminal lobes slender, tapering and with a length about five times the width. Type Cecid. A 2976.

Mycodiplosis indica, n. sp.

A series of midges was reared on 5th December, 1916, by Y. Ramachandra Rao, from larvæ feeding on rust spores growing on leaves of *Pennisetum typhoideum*, collected at Coimbatore, India.

Male. Length 1 mm. Antennæ twice the length of the body, thickly haired, pale yellowish, 14 segments, the fifth with stems each two and a half times the diameter, basal segment subglobose, the distal enlargement broadly pyriform. Palpi : the first and second segments short, indistinct, the third with a length about three times its diameter, the fourth about as long as the third, more dilated. Mesonotum reddish brown, the submedian lines rather thickly yellow haired. Scutellum fuscous yellowish, postscutellum reddish yellow, abdomen deep red, genitalia yellowish, halteres and legs pale straw, claws slender, rather strongly curved, the anterior unidentate, the pulvilli rudimentary. Genitalia : basal clasp segment slender ; terminal clasp segment long, slender ; dorsal plate rather long, broad, broadly and roundly emarginate ; ventral plate moderately long, deeply and triangularly incised, the lobes rather broad and roundly tapering.

Female. Length 1·25 mm. Antennæ nearly as long as the body, sparsely haired, pale yellowish, 14 segments, the fifth with the stem one-third the length of the basal enlargement, which latter has a length about twice its diameter ; terminal segment produced, the basal enlargement with a length three times its

diameter, and apically a rather long, fusiform appendage. Palpi: first segment short, quadrate, the second with a length over twice its diameter, the third a little longer, broader, the fourth about one-fourth longer than the third, more slender. Mesonotum dark reddish brown, the submedian lines sparsely haired. Scutellum and postscutellum reddish brown. Abdomen dark reddish brown. Halteres and legs pale straw. Ovipositor short, the terminal lobes subquadrate and sparsely clothed with short, stout setæ, otherwise nearly as in the male. Type Cecid. A 2980.

Diadiplosis indica, n. sp.

This species was reared by C. S. Misra on 4th November, 1918, from larvæ preying upon *Phenacoccus hirsutus* on mulberry and *Pseudococcus corymbatus* and *Phenacoccus hirsutus* on cotton at Pusa, India. It was also taken by T. Bainbrigge Fletcher in the corners of a house in August 1918. The insect approaches *D. smithi*, Felt, from which it may be easily distinguished by the distinctly shorter loops of the circumfila. The above-mentioned characters and the relatively few circumfila loops differentiate it from the peculiar West Indian *D. buscki*, Felt.

Male. Length 2 mm. Antennæ a little shorter than the body, rather thickly haired, 14 segments, the fifth with stems one-half and one and one-fourth times their diameters respectively, the circumfila moderately long, stout, and with about ten loops. Palpi: first segment irregularly obconical, second segment with a length about three times its diameter, the third one-half longer and more slender. Mesonotum dark reddish brown. Scutellum reddish brown. Postscutellum a little lighter, abdomen dark reddish brown. Legs a pale yellowish. Genitalia: basal clasp segment rather long, moderately stout; terminal clasp segment short, stout; dorsal plate deeply and triangularly emarginate; the ventral plate broad and broadly rounded.

Female. Length 2 mm. Antennæ probably about three-fourths the length of the body, sparsely haired, 14 segments, the fifth with a stem about one-fifth the length of the cylindric basal enlargement, which latter has a length about one-half greater than its diameter. Mesonotum dark brown, scutellum and postscutellum fuscous yellowish, abdomen yellowish brown. Ovipositor short, the terminal lobes narrowly oval and sparsely setose. Otherwise as in the male. Type Cecid. A 2988.

Raodiplosis, n. g.

The very narrow wings with a length nearly four times the width, the structurally peculiar genitalia with a length one-fourth or one-third that of

the abdomen and the moderately long ovipositor serve to distinguish this genus from *Caryomyia*, Felt, and *Macrodiplosis*, Kieff., with which it falls in our key because of the simple claws, the quadriarticulate palpi, the third vein uniting with the margin before the apex of the hyaline wings and the short bows of the circumfila on the binodose antennal segments of the male. Type: *R. orientalis*, n. sp.

Raodiplosis orientalis, n. sp.

A considerable series of midges was taken on 28th February, 1918, by A. G. Rao on mango stems at Thaton, Burma. Nothing is known concerning the life-history of this interesting form.

Male. Length 3·5 mm. Antennæ nearly as long as the body, sparsely haired, yellowish, 14 segments, the fifth with stems one and a half and twice their diameters respectively; the basal enlargement subglobose, with a sparse subbasal whorl of long, stout setæ and a subapical circumfila, the loops with a length about half the diameter of the enlargement; distal enlargement somewhat produced, subcylindric, with a length nearly twice its diameter, a sparse whorl of long, stout, setæ near the distal third and subbasal and subapical circumfila with loops as on the basal enlargement; terminal segment produced, the basal enlargement subglobose, the stem short, the distal enlargement produced, with a length about four times its diameter and tapering to a fingerlike process, nearly one-half the length of the enlargement. Palpi: first segment short, irregular, the second with a length about three times its diameter, the third one-half longer than the second and the fourth a little longer than the third and distinctly swollen near the distal third. Mesonotum dark brown, submedian lines yellowish. Scutellum pale yellowish. Postscutellum darker. Abdomen reddish brown, the large genitalia yellowish. Wings hyaline with a length fully four times the width, subcosta uniting with the margin at the basal third, the third vein just beyond the apex, the fifth joining the posterior margin at the distal fourth, its branch at the basal third. Halteres mostly whitish transparent. Coxæ and legs pale straw. Claws rather stout, slightly curved, the pulvilli nearly as long as the claws. Genitalia with a length one-fourth to one-third that of the abdomen: basal clasp segment long, moderately stout; terminal clasp segment long, slender, dentate apically; dorsal and ventral plates short, broad and broadly emarginate.

Female. Length 4 mm. Antennæ about three-fourths the length of the body, sparsely haired, fuscous yellowish, 14 segments, the fifth with a stem bout one-third the length of the cylindric basal enlargement, which latter has

a length three times its diameter, a subbasal and subapical sparse whorl of stout setæ and moderately high circumfila, connected by longitudinal fila, occur at the basal fourth and apically; terminal segment produced, with a length about five times its diameter and tapering to a moderately stout appendage, the latter with a length about one-third that of the enlargement. Palpi: first segment short, irregular, the second with a length fully three times its diameter, the third a little longer, more slender, the fourth about one-third longer than the third, more slender. Mesonotum reddish brown, the submedian lines yellowish. Scutellum and postscutellum reddish brown. Abdomen mostly yellowish orange and tapering to the moderately long ovipositor, the latter with a length about one-third that of the abdomen, the apical lobes thickly setose and with a length nearly three times the width. Otherwise practically as in the male. Type Cecid. A 2982.

Described from alcoholic specimens and the colours for both sexes are therefore approximate.

Orseoliella apludae, n. sp.

A series of midges was reared on 1st January, 1917, by Y. Ramachandra Rao from galls in the shoots of *Apluda varia* collected at Coimbatore, South India. The species is a peculiar one and is tentatively referred to this genus.

Male. Length 4 mm. Antennæ probably as long as the body, sparsely haired, light brown, 14 segments, the fifth with stems one and one-fourth and twice their diameters respectively; basal enlargement subglobose, the distal enlargement with a length over twice its diameter and with a distinct constriction near the basal third, the loops of the circumfila moderately long and rather thick; terminal segment wanting. Palpi probably quadriarticulate. Mesonotum reddish brown. Scutellum and postscutellum yellowish brown. Abdomen pale yellowish. Genitalia somewhat fuscous, halteres and legs yellowish transparent. Genitalia: basal clasp segment long, broad at base and with an obtuse lobe at the internal basal angle; terminal clasp segment rather short, stout, curving and tapering slightly; dorsal and ventral plates apparently fused to form a broadly conical, compound structure.

Female. Length 4 mm. Antennæ about three-fourths the length of the body, sparsely haired, light brown, 14 segments, the fifth with a stem one-third the length of the cylindric basal enlargement, which latter has a length three and a half times its diameter, is slightly thickened apically and has sparse whorl of short, stout setæ; terminal segment, the basal enlargement with a length about three times its diameter, apically a rather stout fusiform appendage. Palpi: first segment short, stout, the second with a length nearly three times its width,

the third a little longer than the second and the fourth about half the length of the third. Mesonotum reddish brown, the submedian lines yellowish, scutellum yellowish brown, postscutellum a little lighter. Abdomen reddish brown, halteres and legs pale straw. Claws rather long, slender, simple, the pulvilli a little shorter than the claws. Ovipositor short, the terminal lobes narrowly oval and thickly clothed with short, stout setæ. Type Cecid. A 2974.

Itonida penniseti, n. sp.

This species was reared on 11th December, 1916, from ear-heads of *Pennisetum cenchroides*, collected by Y. Ramachandra Rao at Coimbatore.

Male. Length 1·75 mm. Antennæ one-half longer than the body, rather thickly haired, yellowish, 14 segments, the fifth with stems one and a half and two and one-fourth times their diameters respectively; the basal enlargement subglobose, the distal enlargement broadly pyriform, the circumfila rather short; terminal segment produced, the basal portion of the stem with a length over three times its diameter, the distal enlargement with a length over twice its diameter, a distinct constriction at the basal third, apically a pseudo-articulate fusiform process nearly as long as the distal enlargement. Palpi: first segment subquadrate, the second with a length four times its diameter, the third about as long as the second and the fourth about twice the length of the third. Mesonotum yellowish brown, the submedian lines sparsely haired. Scutellum and postscutellum fuscous yellowish. Abdomen fuscous yellowish, basal segment reddish brown. Genitalia fuscous, halteres and legs pale straw. Genitalia: basal clasp segment moderately long, stout; terminal clasp segment swollen near the middle and tapering broadly apically; dorsal plate short, broadly and triangularly emarginate, the lobes divergent, sparsely setose and tapering roundly to an obtuse apex; ventral plate moderately long, broadly and roundly emarginate, the lobes narrowly rounded and thickly setose apically.

Female. Length 1·5 mm. Antennæ as long as the body, thickly haired, yellowish brown, 14 segments, the fifth with the stem three-fourths the length of the cylindric basal enlargement, which latter has a length about twice its diameter and bears a thick whorl of long, stout setæ; terminal segment with a length two and a half times its diameter and apically a broadly fusiform, pseudo-articulate appendate with a length about half that of the basal enlargement. Mesonotum mostly pale yellowish, the anterior and lateral margins brownish. Scutellum brownish yellow, postscutellum light brown, abdomen brownish yellow. Coxæ and halteres yellowish transparent, the legs mostly pale straw. Claws slender, slightly curved, the pulvilli as long as the claws, ovipositor

nearly half the length of the abdomen, the terminal lobes narrowly oval and parsely setose. Type Cecid. A 2977.

Horidiplosis, n. g.

This genus belongs in the series of trifili having simple claws and uniarticulate palpi. The structure of both the genitalia and ovipositor prevent its reference to the series of four genera, namely, *Monarthropalpus*, Rubs., *Onodiplosis*, Felt, *Cystodiplosis*, Kieff., and *Gnesiodiplosis*, Tav., having hyaline wings. The type of this genus is *H. fici*, n. sp.

Horidiplosis fici, n. sp.

The series of midges described below was reared on 21st February, 1918, by C. S. Misra from pustules on *Ficus infectoria* leaves collected at Pusa, India. The species is remarkable for the very long, tapering palpal segment.

Male. Length 2·5 mm. Antennæ as long as the body, thickly haired, pale yellowish, 14 segments, the third and fourth fused, the fifth having the stems with a length half and one and one-fourth times their diameters respectively; basal enlargement subglobose, with a subbasal whorl of stout setæ and a subapical circumfilum, the loops extending to the basal third of the distal enlargement, which latter has a length half greater than its diameter, a sparse whorl of stout setæ near the distal fourth and subbasal and subapical circumfila, the loops of the distal filum extending nearly to the tip of the segment; terminal segment with the basal enlargement subglobose, the basal portion of the stem with a length about twice its diameter, the distal enlargement broad, with a length about one-fourth greater than its diameter and apically with a short, very stout, roundly conical process. Palpus consisting of one long, tapering segment, with a length approximately seven times its diameter. Eyes holoptic. Mesonotum reddish brown, scutellum and postscutellum reddish brown. Abdomen dark brown. Wings hyaline, with a length about three times the width, subcosta uniting with the anterior margin near the basal half, the third vein just beyond the apex, the fifth joining the posterior margin at the distal fourth and its branch near the basal half. Halteres and legs mostly pale straw. Claws moderately long, rather stout, slightly curved, the pulvilli about two-thirds the length of the claws. Genitalia: basal clasp segment moderately long, stout; terminal clasp segment rather long, stout, somewhat swollen basally; dorsal plate deeply, broadly and roundly emarginate, the lateral margins strongly rolled ventrally; ventral plate moderately long, broad and broadly emarginate; style short, stout.

Female. Length 3 mm. Antennæ about three-fourths the length of the body, sparsely haired, fuscous yellowish, 14 segments, the fifth with a stem about one-fifth the length of the basal enlargement, which latter has a length about three and a half times its diameter, sparse whorls of subbasal and subapical setæ and stout, moderately high circumfila at the basal third and apically; terminal segment subcylindrical, somewhat reduced, with a length about three times its diameter and apically a button-like knob. Palpus consisting of one long, slender, curved, tapering segment with a length about seven times its diameter. Mesonotum reddish brown. Scutellum and postscutellum fuscous yellowish, abdomen a variable fuscous yellowish, the basal segments somewhat darker. Halteres and legs pale straw. Ovipositor moderately stout, about two thirds the length of the abdomen when extended, the apical lobes sparsely clothed with long setæ, roundly triangular and with a length about twice its width, otherwise as in the male. Type Cecid. A 2991.

Cecidomyia penniseti, n. sp.

One female was reared on 4th December, 1916, from ear-heads of *Pennisetum typhoideum*, collected by Y. Ramachandra Rao at Coimbatore, India. It is possibly predaceous. The species is so peculiar that we have considered it best to describe the female even although somewhat broken and although it be not advisable to refer the species to one of the well-defined genera. This latter will be comparatively easy when more abundant material is secured, particularly if both sexes are available.

Female. Length 2 mm. Antennæ about three-fourths the length of the body, thickly haired, pale yellowish, probably 14 segments, the fifth with a stem one-third the length of the subcylindric basal enlargement, which latter has a length a little over twice its diameter, and with a rather thick whorl of moderately long setæ near its middle; the moderately high circumfila occur near the basal fourth and apically, the enlargement tapering slightly to the unusually thick stem; terminal segment wanting. Palpi: first segment probably short, irregular, second probably oval, the third with a length about three times its width, the fourth a little longer than the third. Mesonotum reddish brown, the submedian lines sparsely haired. Scutellum and postscutellum yellowish brown. Abdomen yellowish orange. Wings hyaline. Coxæ and halteres yellowish transparent, the third vein uniting with the margin a little beyond the apex. Coxæ pale straw. Legs unusually long and slender, mostly pale straw. Claws moderately stout, slightly curved, the pulvilli rudimentary. Ovipositor about half the length of the abdomen, the terminal lobes narrowly oval and with sparse short, stout setæ. Type Cecid. A 2978.

June 1920. ENTOMOLOGICAL SERIES. VOL. VII, No. 2.

MEMOIRS OF THE DEPARTMENT OF AGRICULTURE IN INDIA

DESCRIPTION OF A RHINOCYPHINE LARVA FROM SHILLONG

BY

MAJOR F. C. FRASER, I.M.S.

AGRICULTURAL RESEARCH INSTITUTE, PUSA

PRINTED AND PUBLISHED FOR

THE IMPERIAL DEPARTMENT OF AGRICULTURE IN INDIA

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PREFACE

The discovery of the larva of *Rhinocypha* fills a decided gap in our knowledge of the Libellagine Zygoptera. So far as the Indian Fauna is concerned the Libellagine group of the Epallaginæ include the genera *Libellago*, *Micromerus*, and *Rhinocypha* and perhaps *Philoganga*, the last three of which are Oriental in their distribution, although *Rhinocypha* extends into the Australian Region as well. So far as the adult characters are concerned Munz has lately pointed out, in his "Venational Study of the Suborder Zygoptera" (*Amer. Ent. Soc., Mem.* III (1919), p. 12), that "*Rhinocypha, Libellago* and *Micromerus* form rather a compact and distinct group with M_4 arching forward and Cu_2 backward, more so than in the related genera, and with R_s and M_2 parallel at their tips and with two prominent sectors between" .....whilst Tillyard, in his "Biology of Dragonflies," page 274, distinguishes this group as :—

Wings petiolate. Numerous antenodals, but those of first and second series not corresponding beyond arculus. Arculus about halfway between base and nodus, or nearer to base (much nearer in *Philoganga*) ..	Libellagini.
Wings not petiolate. Numerous antenodals, those of first and second series nearly all corresponding. Arculus close to base, far removed from nodus	Epallagini.

Tillyard thus includes *Philoganga* in the Libellagini, although he notes that the arculus is nearer to base of wing than in the other genera. In his key to the genera of Epallaginæ, which he does not subdivide into tribes, Munz notes that the three genera *Rhinocypha*, *Libellago* and *Micromerus* are distinguishable by the area posterio

to Cu_2 having a single row of cells (occasionally two cells wide for a short distance ; but if so, Cu_2 is not arched) and the arching forward of M_4 beyond MA, whereas he places *Philoganga* and *Caliphœa* in a group characterized by the area posterior to Cu_2 having more than one row of cells beyond MA, whilst M_4 is generally not prominently arched beyond MA ; and on page 12 of his Memoir he remarks on the beginning of the tendency for R_s and M_3 to arise nearer to the subnodus in *Philoganga*. It will be seen, therefore, that the genus *Philoganga* falls rather outside of the compact group formed by the genera *Rhinocypha*, *Libellago* and *Micromerus*, and as its larva remains unknown, its exact position remains somewhat doubtful.

Turning to the larval characters, Tillyard (*loc. cit.*) defines the larva of the Epallagini (with Indian genera *Anisopleura*, *Bayadera*, *Caliphœa*, *Epallage* and *Pseudophœa*) as provided with 6-7 pairs of lateral abdominal gills and with caudal gills in the form of ovoid sacs, ending in a point, and on page 200, figure 87, he figures a larva of *Pseudophœa* to show these caudal sacci and lateral abdominal gills and states that the latter occur on either side of abdominal segments 2-8 in the larvæ of *Pseudophœa*, *Bayadera* and *Anisopleura*.

Tillyard states that the larva of the Libellagini is not known for certain but refers to a figure and description by Karsch, in *Berlin. Ent. Zeits.*, Vol. XXXVIII (1893), of a larva from Togoland which he considers to be very probably a *Libellago* ; in any case, Karsch's figure and brief description leave the exact identity doubtful. Fraser has recently described the larva of *Micromerus lineatus* in the *Records of the Indian Museum* (Vol. XVI, pp. 197–198, tab. 23 ; February 1919) and in the present paper gives a description of a larva which is almost certainly that of *Rhinocypha ignipennis*, as the adults of this species occurred in very large numbers along the stream in which it was found. As Laidlaw has remarked (*Records of the Indian Museum*, Vol. XVI, page 195 ; February 1919) the discovery of the larva of a species of *Rhinocypha*, to which that of the larva of *Micromerus* may also now be added, "is of interest as helping to strengthen the opinion that the Libellaginæ should stand as a distinct subfamily."

The larva of *Micromerus lineatus* is always found in fast running water, in which it clings to roots, submerged twigs and other debris, rarely to the stems of weeds or reeds (Fraser). All the species of *Rhinocypha* also seem to be attached to running water, but the larval habits still remain something of a mystery. Submerged weeds, sticks, stones and debris generally, besides mud from the bottom and sides of the stream, were all examined in great quantity without any tangible results except for this one larva which was found amongst submerged weed; yet the larvæ must have been present in considerable numbers and further knowledge of their habits will doubtless lead to their discovery with comparative ease. In the case of other species of *Rhinocypha*, such as *R. spuria*, which are attached to streams running over rocky beds, it is probable that the larvæ cling on to, or perhaps beneath, rocks and stones but prolonged search in such situations has so far met with no success in their discovery.

PUSA,
27th January, 1920.

T. BAINBRIGGE FLETCHER,
Imperial Entomologist.

DESCRIPTION OF A RHINOCYPHINE LARVA FROM SHILLONG.

BY

MAJOR F. C. FRASER, I.M.S.

(Received for publication on 28th January, 1920.)

The single specimen under description was taken by Mr. Bainbrigge Fletcher after some weeks of patient search in the rivulets about Shillong.

Both *R. ignipennis* and *R. cuneata** are common there, the former occurring in considerable numbers, flitting along the banks of the particular stream where the present specimen was found lying up in water weed.

It is still an unsolved problem as to where the insects hide themselves. Resting places such as weeds, rocks, beneath stones in the river bed, in mud, on roots and submerged twigs, were all tried in succession without result except for the one solitary specimen now under description.

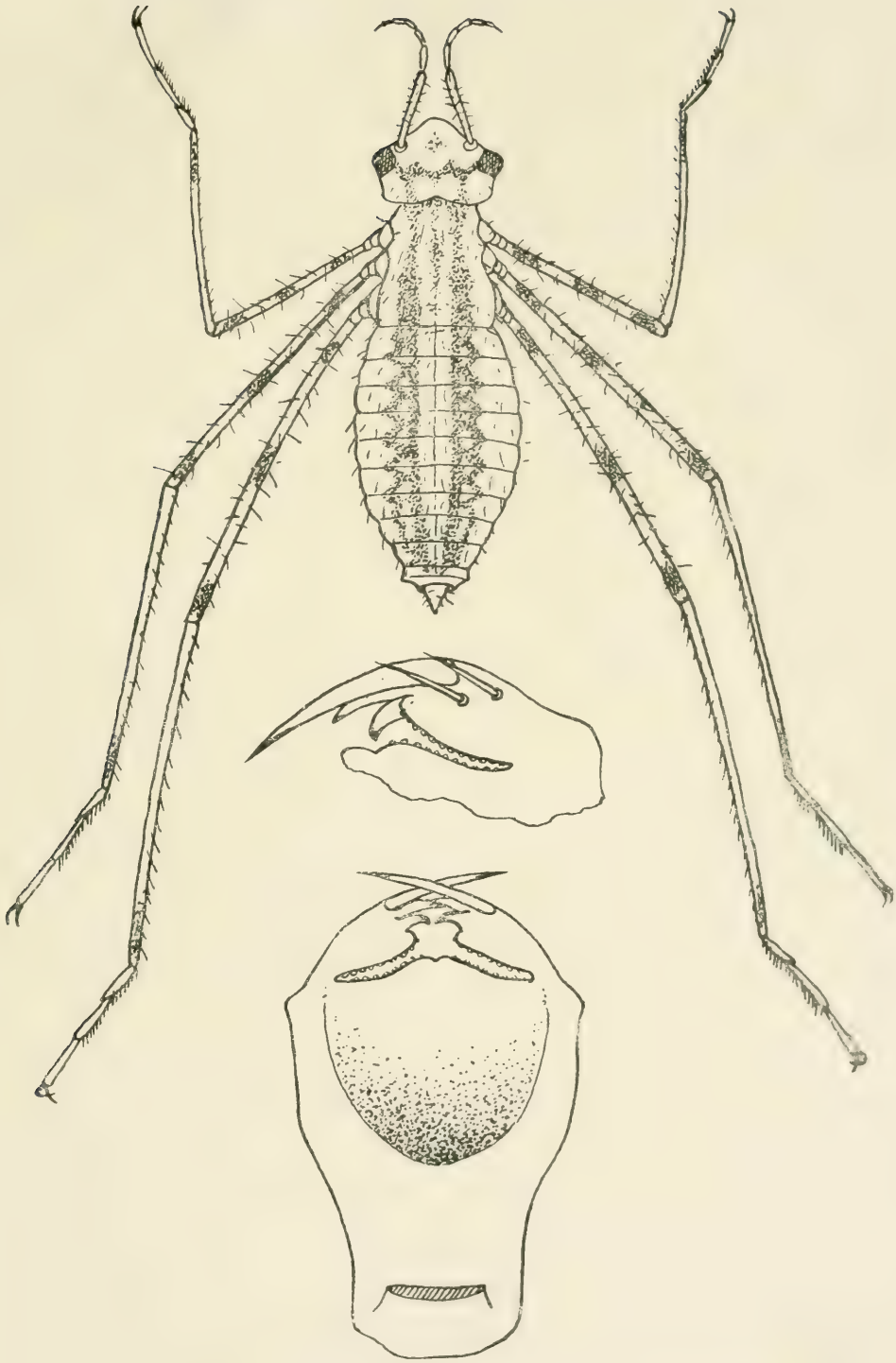
Dr. Laidlaw has published a brief note about the larva of a *Rhinocypha* in the *Indian Museum Records*, Vol. XVI, p. 195 (1919), but the larva has, with this exception, hitherto remained unknown. Mr. Fletcher's specimen is not fully developed and has not yet acquired wing cases; it is probably the larva of *R. ignipennis* as this insect was common along the banks of the stream where the larva was found, whereas *R. cuneata* was never found there.

The head is somewhat square, the eyes projecting but slightly and deeply pigmented. The antennæ are typically Calopterygine in character, the first segment being as long as all the rest taken together. The mask is flattened

*Major Fraser has identified as *R. cuneata* a *Rhinocypha* which is fairly common along rocky-bedded streams in Shillong from June to August. These specimens, however, differ markedly from examples of *R. cuneata* from Darjiling contained in the Pusa Collection and I consider them referable to *R. spuria*, Selys. It may be added that in October 1919, I took a pair of *R. quadrimaculata*, Selys, at Shillong, but neither *R. spuria* nor *R. quadrimaculata* has ever been seen along this stream (which is little better than an open ditch of water running between muddy banks in the meadow opposite the Convent) along which *R. ignipennis* occurs abundantly in September and October. There is no doubt in my mind that the larva here described is that of *R. ignipennis*.—[T.B.F.]

but the middle lobe is deeply cupped and shows but the slightest notch, not amounting to a fissure. The free borders of the lobes are minutely crenate. The lateral lobes bear a robust, moveable hook with two setæ situated at its base and two robust, short teeth internal to the moveable hook. The head, antennæ and mask very closely resemble those of *Micromerus*. The body is rounded, short and pigmented in a definite pattern ; the legs are of great length, slim and spidery and adapted for clinging to weeds or roots.

The larva has no caudal gills, nor can any site be made out where such could have been articulated. It is more probable that *Rhinocypha* larvæ do not possess these organs than that the specimen under description has lost them through autotomy. This opinion is supported in Dr. Laidlaw's note mentioned above, wherein he states apropos his own specimen, " The caudal gills are unfortunately missing." It is more probable that Dr. Laidlaw's specimen never possessed any. Both *Rhinocypha* and *Micromerus* are apparently purely proctobranchiates, the former having no caudal gills and the latter only rudimentary and non-functional ones. Neither possess lateral, abdominal gills as in the *Epallaginæ*. It is not at all probable that caudal gills may be acquired in the adult stage, as *Micromerus* possesses them in the earliest instars. As a rule, the gills of Zygopteran larvæ are relatively larger in the juvenile than in the adult stages.



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